

6 substrate, as measured lengthwise through said closed woven mesh.

1 10. (Amended) The laminate support used in the process of wire bonding a circuit device in
2 accordance with claim 7, wherein said woven mesh comprises fiberglass.

1 11. (Amended) The laiminate support used in the process of wire bonding a circuit device in
2 accordance with claim 7, wherein said woven mesh is between approximately 2.5 and 4.0
3 mils thick.

REMARKS

The specification is amended to reference the parent application, S.N. 09/347,580.

Claims 13-20 are canceled. Claims 1-17 were withdrawn in the parent application
S.N. 09/347,580.

Original independent claim 1 is amended to further include a substrate having a first
surface and to further define the invention. Support is found on page 8, line 17.

Original dependent claims 4 and 5 are amended further to define the invention of these
claims.

Original independent claim 7 is amended to further include a substrate having a first
surface and to further define the invention. Support is found on page 8, line 17.

Original dependent claims 10 and 11 are amended to further define the invention of
these claims.

Support being provided for all the above amending, this amending does not constitute the addition of new matter and entry is urged.

Attached hereto are marked-up versions of the changes made to the specification and claims by the current amendment. The attached pages are captioned VERSION WITH MARKINGS TO SHOW CHANGES MADE.

Copies of the IDS and PTO-1449 form mailed on 9/30/99 in the parent application S.N. 09/347,580, are included herewith. Upon request, copies of the documents cited in the IDS and PTO-1449 form will be provided.

The Application is deemed in condition for allowance and such action on the part of the Examiner is respectfully requested. Should the Examiner believe, however, that minor differences remain which, if overcome, would result in allowance of the Application and that said differences can be openly discussed in a phone conversation, the Examiner is cordially requested to phone the undersigned, collect, at the number provided below, for the purpose of discussing these differences and hopefully obtaining allowance of the Application.

Respectfully submitted,

Dated: April 5, 2001

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WIRE BONDING METHOD AND APPARATUS

Field of the Invention:

The present invention relates to large scale integrated circuit manufacture and, more particularly, to an improved method and apparatus for bonding wire to a circuit device supported by an improved base laminate that increases the resistance of the circuit device to deform.

Added "Cross Reference to Copending Application"

BACKGROUND OF THE INVENTION

In recent times, as large scale integrated circuits have become denser, the copper wires in the pads have become ever thinner. Working with such thin wires, placing and attaching them to appropriate sites, has thus become ever more challenging.

During assembly, the pads are supported by a mesh laminate, while a capillary tool is used to attach the fine wiring onto the pads. As the tip of the capillary tool



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Field of the Invention:

5 The present invention relates to large scale integrated circuit manufacture and, more particularly, to an improved method and apparatus for bonding wire to a circuit device supported by an improved base laminate that increases the resistance of the circuit device to deform.

Cross Reference to Copending Application

10 This application is a divisional application of S.N. 09/347,580, filed 07/01/99.

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During assembly, the pads are supported by a mesh laminate, while a capillary tool is used to attach the fine wiring onto the pads. As the tip of the capillary tool

VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 1, 4, 5, 7, 10 and 11 have been amended as follows:

1 1. (Amended) A laminate support used in the process of wire bonding, a circuit device,
2 comprising:

3 a substrate having a first surface; and

4 a wire having a diameter positioned on said first surface of said substrate, said substrate
5 including a closed woven mesh having strands whose separation distance is equal to or
6 less than the said diameter of said wire ~~of said circuit device~~ on said first surface of
7 said substrate.

1 4. (Amended) The laminate used in the process of wire bonding a circuit device in accordance
2 with claim 1, wherein said ~~laminate support~~ woven mesh comprises fiberglass.

1 5. (Amended) The laminate used in the process of wire bonding a circuit device in accordance
2 with claim 1, wherein said ~~laminate support~~ woven mesh is between approximately 2.5
3 and 4.0 mils thick.

1 7. (Amended) A laminate support used in the process of wire bonding a circuit, device,
2 comprising:

3 a substrate having a first surface; and

4 a wire having a thickness positioned on said first surface of said substrate, said substrate
5 including a closed woven mesh having warp and weave strands, whose separation
6 distance is equal to or less than the thickness of said wire ~~of said circuit device~~ on said
7 first surface of said substrate, as measured lengthwise through said closed woven mesh.

1 10. (Amended) The laminate support used in the process of wire bonding a circuit device in
2 accordance with claim 7, wherein said ~~laminate support~~ woven mesh comprises
3 fiberglass.

1 11. (Amended) The laiminate support used in the process of wire bonding a circuit device in
2 accordance with claim 7, wherein said ~~laminate support~~ woven mesh is between
3 approximately 2.5 and 4.0 mils thick.

Claims 13-20 have been canceled.

1 11. The laminate support used in the process of wire
2 bonding a circuit device in accordance with claim 7, wherein
3 said laminate support is between approximately 2.5 and 4
4 mils thick.

1 12. The laminate support used in the process of wire
2 bonding a circuit device in accordance with claim 7, wherein
3 said circuit device comprises a pad of large scale
4 integrated design.

Claims cancelled

1 13. A laminate support used in the process of wire
2 bonding a circuit device, comprising a closed woven mesh
3 having warp and weave strands, whose separation distance is
4 no greater than the diameter of said wire of said circuit
5 device as measured lengthwise through said closed woven
6 mesh, and wherein said separation distance is approximately
7 equal to or less than 0.7 mils.

1 14. The laminate support used in the process of wire
2 bonding a circuit device in accordance with claim 13,
3 wherein said separation distance is between 0.2 and 0.7
4 mils.

1 15. The laminate support used in the process of wire
2 bonding a circuit device in accordance with claim 13,
3 wherein said laminate support comprises fiberglass.

1 16. The laminate support used in the process of wire
2 bonding a circuit device in accordance with claim 13,
3 wherein said laminate support is between approximately 2.5
4 and 4 mils thick.

1 17. The laminate support used in the process of wire
2 bonding a circuit device in accordance with claim 13,
3 wherein said circuit device comprises a pad of large scale
4 integrated design.

1 18. A method for supporting a circuit device during
2 wire bonding, comprising the steps of:

3 a) applying a capillary tool to wire that is to
4 be bonded to a circuit device; and

5 b) supporting said circuit device upon a closed
6 woven mesh whose separation distance between woven strands
7 is less than or equal to a diameter of said wire.

1 19. The method of claim 18, wherein said separation
2 distance is approximately equal to or less than 0.7 mils.

1 20. The method of claim 18, wherein said separation
2 distance is between approximately 0.2 and 0.7 mils.

What is claimed is:

- 1 1. A laminate support used in the process of wire bonding, a
2 circuit device comprising:
3
4 a substrate having a first surface; and
5
6 a wire having a diameter positioned on said first surface of
7 said substrate, said substrate including a closed woven mesh
8 having strands whose separation distance is equal to or
9 less than said diameter of said wire on said first surface
10 of said substrate.
- 1 2. The laminate support used in the process of wire bonding a
2 circuit device in accordance with claim 1, wherein said
3 separation distance is no greater than 0.7 mils.
- 1 3. The laminate support used in the process of wire bonding a
2 circuit device in accordance with claim 1, wherein said
3 separation distance is between 0.2 and 0.7 mils.
- 4 4. The laminate used in the process of wire bonding a circuit
5 device in accordance with claim 1, wherein said woven mesh
6 comprises fiberglass.
- 1 5. The laminate used in the process of wire bonding a circuit
2 device in accordance with claim 1, wherein said woven mesh
3 is between approximately 2.5 and 4.0 mils thick.
- 1 6. The laminate support used in the process of wire bonding a
2 circuit device in accordance with claim 1, wherein said
3 circuit device is a pad of large scale integrated design.

- 1 7. A laminate support used in the process of wire bonding a
2 circuit, device comprising:
- 3 a substrate having a first surface; and
- 4 a wire having a thickness positioned on said first surface
5 of said substrate, said substrate including a closed woven
6 mesh having warp and weave strands, whose separation
7 distance is equal to or less than the thickness of said wire
8 on said first surface of said substrate, as measured
9 lengthwise through said closed woven mesh.
- 1 8. The laminate support used in the process of wire bonding a
2 circuit device in accordance with claim 7, wherein said
3 separation distance is equal to or less than 0.7 mils.
- 1 9. The laminate support used in the process of wire bonding a
2 circuit device in accordance with claim 7, wherein said
3 separation distance is between 0.2 and 0.7 mils.
- 1 10. The laminate support used in the process of wire bonding a
2 circuit device in accordance with claim 7, wherein said
3 woven mesh comprises fiberglass.
- 1 11. The laminate support used in the process of wire bonding a
2 circuit device in accordance with claim 7, wherein said
3 woven mesh is between approximately 2.5 and 4.0 mils thick.
- 1 12. The laminate support used in the process of wire bonding a
2 circuit device in accordance with claim 7, wherein said
3 circuit device comprises a pad of large scale integrated
4 design.